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THE PET KANGAROO AND HIS TRAINER: AUSTRALIA

Many circuses have boxing kangaroos. In nature, the kangaroo, when attacked, if a line of retreat is not open, usually backs up against a tree and defends itself with its fore feet. Trainers turn this method of defense to their advantage by putting boxing-gloves on the kangaroo's fore feet, and then training him in the manly act of self-defense. The boxer who can break through a kangaroo's guard is a good one. (See Bulletin No. 1.)

HOW TO OBTAIN THE BULLETIN

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Marvelous Melbourne: Which U. S. Fleet May Visit

MELBOURNE, Australia, will be one of the scenes of gaiety and stirring welcome, if proposals now being considered in Washington for a friendly visit of the Pacific fleet to Australia next year are decided upon favorably.

Melbourne is the fourth overseas city of the British Empire. It was threatened by a mob when its police struck a few months ago, and it faced an experience strangely like an occurrence during its pioneer days.

When Harbor Held 59 Crewless Vessels

Melbourne first found itself suddenly policeless in the early "fifties," when the discovery of gold at famous Ballarat turned the infant city upside down. Policemen literally dropped their night sticks on their beats and rushed to the near-by gold fields along with the butchers and bakers, the merchants and lawyers, and most of the other men of the community. Soon Melbourne was a town of women and children except for the horde of adventurers who were pouring through to "the diggings."

Even the men of the ships that touched at Melbourne promptly deserted, sometimes making a clean sweep from master to cabin boy; and at one time 59 crewless vessels lay in the harbor. This situation presented grave social dangers. British marines were rushed to the city, and acting quickly, after the fashion of their American fellow service men, "had the situation in hand." A further parallel in Melbourne's history is that during the recent police strike, British bluejackets from the harbor came to the rescue, and helped keep order until the civilian police force could be organized anew.

Marvelous Melbourne Blooms in the "Bush"

Melbourne had been in existence only a few years when the gold discoveries were made. Like San Francisco, which was begun about the same time, it was born with a gold spoon in its mouth, and became a city of wealth almost from the start. Victoria, of which province the city is the capital, was the most rapidly settled division of Australia; and Melbourne, growing with it, soon passed the boom-town stage and came to be pridefully referred to as "Marvelous Melbourne."

It lives up to the cognomen today. It is built on generous lines, is slumless, is rich in beautiful parks and broad tree-lined streets and avenues; and its provincial and federal government buildings constitute one of the handsomest collections of such structures to be found on any continent. With its population close to the 800,000 mark, it is mid-way between St. Louis and Cleveland in size, yet numerous oldtimers are alive who remember when the site of the great city of today was just "bush," as Australians call their back country wilderness.

Temporary Capital Until Canberra Rises

It has a great, roomy harbor with the outer portals of its bay some forty miles or more from the city's quays. Attractive residential suburbs, connected

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A BURIAL ON THE SAHARA

The mourners are separated into two groups—one composed of men and the other of women—who are all howling and wailing at the top of their voices, the inevitable sign of mourning in the Orient. (See Bulletin No. 3.)

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Nitrates and Where They Come From

NITRATES, given prominent place in a recent report by the Department of Commerce listing the most important raw materials for which America now must look to the outside world, make up one of the groups of non-precious minerals with which Nature has been most stingy. Again nitrates have been in the public eye in connection with the Muscle Shoals dam where the Government planned during the World War to produce them artificially.

For ages man did not realize how keenly he needed nitrates. The plants he grew demanded nitrogen as they do today, and their roots foraged for it as best they could. Early farmers and gardeners were not chemists; but they were good observers, and they found that manure added to the soil helped their crops. So, quite without knowing it, they fed nitrogen to the plants.

Population Pressure Causes Scramble for Nitrogen

Manure met the needs of the early farmers; but in recent generations the pressure of population became so great in some countries, such as Germany, that there was grave danger of famine or at least the necessity for importing food, even though the land was kept continually busy. Scientists looked into the situation and found that every plant that grows takes certain minerals out of the soil, and that, in amounts removed, nitrogen leads all the rest. A ton of wheat, for example, removes from the soil 47 pounds of nitrogen, 18 pounds of phosphoric acid, and 12 pounds of potash, as well as smaller quantities of perhaps a dozen other minerals. It became apparent that manure alone could hardly furnish enough nitrogen to land on which crops were grown continually, and from which greater and greater production must be had. The realization opened up the fundamental demand for nitrogen fertilizer—and that put nitrates on the economic map.

No deposits of soluble nitrogen materials of any importance had been found in Europe, where the greatest pressure was felt, nor in Asia nor North America. But beds of sodium nitrate had come to light in the narrow strip of desert in northern Chile, between the Andes and the Pacific Ocean. First opened up in 1830 when the region was under Peruvian and Bolivian ownership, the mining operations did not reach a great magnitude until after Chile annexed the territory in 1880. Since then the world's demand for nitrates has grown so great that by 1913 Chile was exporting between two and three million tons annually. The World War increased the demand, for nitrate is the chief raw material for explosives as well as for wheat and cotton; and Chile's desert deposits kept the guns of the Allies booming.

Four-fifths of the Air Is Nitrogen

No nitrate mines to compete with those of Chile have ever been discovered in the ground of any country. But strangely enough Chile's supremacy has been threatened from the air. Nitrogen is one of the most elusive of the elements. The air all about us is rich in it; four-fifths of the air is nitrogen and only about one-fifth oxygen. But although our lungs utilize the oxygen, we can do nothing with the nitrogen. We breathe it in, and it is expelled unaltered. It bathes

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by paved boulevards, sweep along the edge of the bay for 15 miles from the business center, while other home districts cluster about the city in every direction. Only 25 miles to the east is a picturesque range of low mountains, among which many Melbourne residents have their summer homes. However, democracy and wealth diffusion are so strongly marked that the ever-present servant problem seems unsolvable. And so this city, like its civic sisters in America, is becoming more and more a community of apartment houses and "flats."

Melbourne is the capital of Australia—temporarily. When the Australian Commonwealth was created in 1900 both Melbourne and Sydney had ambitions to become the federal seat of government. Neither would give way, so the problem was solved by setting up a new federal district, like the District of Columbia in the United States. This was carved from New South Wales and it was decreed that Melbourne should be the capital pending the building of the new made-to-order capital, Canberra. It was thought that the permanent capital would be ready in a short time, but for 23 years Melbourne has served as the legislative and administrative center of the Commonwealth and it probably cannot be superseded for several years to come.

Advertised for Its Eldorado

Horse-racing is a passion with the Melbourners of today and each season huge pools and purses are made up on the outcome of contests between famous horses. Perhaps the "prize complex" of the modern Melbourner is another case of history repeating itself, for Melbourne is literally a "prize town." Gold was first discovered in parts of Australia outside Melbourne's "trade territory." The citizens met in a sort of pioneer Boosters' Club and decided that the city needed only a home-talent gold mine to make it a "Bigger and Better Melbourne." Thereupon a "Gold Discovery Committee" was formed and a prize of about $1,000 offered to the first person to find the yellow metal within 200 miles of the city. Prospecting was stimulated and before long nuggets by the sackful were being carted to Melbourne from Ballarat, only 75 miles distant.

On one other occasion Melbourne's penchant for prizes was demonstrated historically. A Melbourne merchant offered a purse of $5,000 to stimulate exploration beyond the coastal fringe that then constituted known Australia. The expedition which this prize encouraged was the beginning of a series of explorations that before long placed the details of a new continent on world maps. The flow of products from the back country that this prize offer helped to open up has brought many a dollar to the building up of "Marvelous Melbourne."

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Sahara's Snow-Clad Peaks on Rail Route

IT SOUNDS like a geographical joke to say that the railway which the French propose building across the Sahara Desert from Oran in Algeria to Tosaye on the Niger River, though most of it will lie in the Torrid Zone, will pass through a volcanic mountain range crowned with snow during three months of the year—the Hoggar Mountains of the Sahara.

This vast mountainous plateau in reality about equals the Alps in area, but most of it lies only from 4,000 to 6,000 feet above sea-level. Two peaks, Mounts Waltellan and Hikena, lying about 900 miles in a straight line almost due south of the city of Algiers, just pass the 8,000-foot mark, and Mount Illimane rises to 9,000 feet.

Pet Notions of Desert Must Go

When one acquires actual scientific knowledge concerning the true nature of the Sahara, some of the pet notions one has had since childhood must go into the discard. The Sahara is not a broad stretch of sandy desert, nor are caravans and armies engulfed in the sands, except very rarely in that portion of the great expanse to the east known as the Libyan Desert.

The alliterative expression "The Sahara is a sea of sand," which so glibly rolls off the tongue, is misleading and partially erroneous, for the surface of the desert offers a great deal of variety ranging from depressions more than 100 feet below sea-level to plateaus five or six thousand feet above, and in isolated instances even higher. Interspersed between the sand-dunes and oases there are also tracts of loose stones and pebbles and valleys which must in ages past have been the beds of streams.

Across this wind-swept waste, whose surface is continually changing, a broad band of rock stretches, sometimes hiding below the surface and sometimes breaking through into plateaus and hills, accounting for the Hoggar massif.

Hoggar Plateau a Geographical Blind Spot

Part of this Hoggar plateau is well-watered and productive, but so few Europeans have been into the area that there is almost no descriptive material on the nature of the country or its people available for the inquisitive reader. One of the most colorful bits of literature touching upon the region is Pierre Benoit's romance "Atlantide." It even boasts a skeleton of a river system though the water is temperamental about its flowing hours, having called a strike many years ago. Sometimes the rivers run for a few months and occasionally for a whole year. The Igharghar, which is a large valley and ancient water-course extending from the Hoggar Mountains a distance of 800 miles to the Shott Melrhir, is still dignified by the name of River, though it is entirely dry. But in its bed may be found a few freshwater shells.

One of the ancient streams which rose in the Hoggar Mountains, the Tafassasset, is believed to have been, years and years ago, part of the course of the Niger River. In cretaceous times, some geologists believe, a great

metals and minerals and most organisms continually without combining with them.

Science, however, put its finger on this elusive nitrogen of the air in the last quarter century, and is able to imprison some of it in forms that make it about as convenient for use in agriculture, industry and war as Chile's product. As in many other recent scientific accomplishments, electricity has been the agent, and some of the most successful "fixation plants"—factories for "fixing" or binding nitrogen to other substances—have been set up near large water power developments. America tried nitrogen fixation at Niagara Falls about a decade before the World War but was not wholly successful. Norway and Germany fared better and turned out some thousands of tons of synthetic nitrogen compounds in prewar days.

German Nitrogen Went to Guns Instead of Fields

During the war Germany was completely cut off from the Chile nitrate fields and necessity compelled her to develop the artificial nitrogen industry if she were to have enough explosives to keep up the fight. Counting all synthetic nitrates and ammonium sulphate from the coke industry, Germany produced in 1913 nitrogenous materials with a nitrogen content of slightly more than 100,000 tons. By the end of the war the country's output of nitrogenous materials, mostly synthetic nitrates, contained over 500,000 tons of nitrogen. Tremendous plants were built and operated by steam power near coal fields. But most of the precious output went into explosives while crops got one-half their usual ration. In final analysis it was nitrogen starvation that brought Germany to her knees. The insufficiently fertilized fields produced smaller crops and there was not enough food to go round.

By the end of the war the amount of nitrogen manufactured in Europe and the United States about equaled the entire world production, including Chile's, before hostilities began. If the world now wanted only its prewar supply of nitrates it might be satisfied from sources wholly outside Chile. But the nitrogen hunger has grown. Each year sees an increased demand, so that Chile is still the important factor. Since, in fact, it supplies the world's deficiency, Chile has the whip hand and the price of the Chilean product dominates the whole industry.

It costs comparatively little to dig up, wash out, and crystallize the sodium nitrate from Chile's vast beds. If lowest cost of production ruled, the price might be only a few dollars a ton. But the cost of production at the poorest mines really sets the starting point for the price, and then the Chilean Government raises it greatly by putting on an export tax of about $12 a ton. Manufacturing synthetic nitrates with electric power and expensive machinery is rather a costly procedure. If Chile suddenly took the export tax off nitrates it might come close to wrecking the entire synthetic industry unless a protective tariff were applied by the countries whose plants were imperiled.

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Icebergs and Violets in April

OCEAN liners arriving at New York last month reported seeing a huge iceberg in the steamship lane. The sight of icebergs at that time of year is not unusual; April is the month of spring flowers and icebergs. The big berg, which an ice-patrol is reported "shadowing," until it shall depart from the traffic route is part of the great company of floating frozen castles which come down into the Atlantic in the spring.

There is something awesome in a mighty iceberg. Its lonesomeness, its huge size, and its shape tend to make it so. One will assume the shape of a cathedral, another that of a domed mosque, and still others look like giant natural bridges. Even those which have not been cut through show vast cavities which hold the lure that always attaches to caverns.

Ice That May Have Known the Century of Tutankhamen

Added to this is the color, by day ever changing from delicate tints of green and blue to mellow sapphire, sometimes as vivacious and varied as fashion's fad, the Deauville scarf; and, by night, glowing with the strange reflected light known as the "ice blink."

So much appears to the eye alone, but with the exercise of a little more imagination one can speculate whether the water that trickles down the iceberg's sides was caught up by the sun before the time of William the Conqueror, or before the birth of Christ, or before Tutankhamen was laid away in his palatial tomb.

For most of the icebergs in the North Atlantic are fragments of Greenland glaciers (some glaciers "calve" an iceberg every few days, as the natives call it) and the great ice mantle of Greenland is some 400,000 square miles in area, nearly three times the size of California.

Since the rate of a glacier's travel is sometimes only a few inches a day, and seldom more than a few yards, it has been estimated that the snows which fell in the interior of Greenland 5,000 or more years ago are just melting again in 1924 as an iceberg crosses the "cold wall" into the Gulf Stream.

Atlantic's "Cold Wall" Nemesis of Bergs

This "cold wall," off the "tail" of the Grand Banks, is just as definite a phenomenon of oceanography as a geological fault in the earth's crust. As the Gulf Stream swings up around the Grand Banks and is met at an obtuse angle by currents of Arctic waters, there sometimes is a difference of temperature of 20 degrees within a ship's length, extending 250 fathoms below the surface, and a sharp contrast in color.

Here is where the proud iceberg, daughter of thousands of winters and ten thousand snows, meets its fate in the gentle warmth of the southern waters. Even the mines of TNT sometimes used by the Ice Patrol are futile with the larger bergs until they have been disintegrated in part by Nature's gentler but infinitely more powerful force.

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portion of the Sahara was under a sea which extended from the Atlantic to the foot of the Hoggar Mountains. Fossil sea urchins, and a nautilus or two recovered from various portions of the desert, seem to bear out the theory.

These mountains, through which the Tropic of Cancer passes, lie on the borderline between the Mediterranean flora of the northern Sahara and the tropical species existing to the south.

Inhabited by Tuaregs With "Taking Ways"

At their base are several well-watered oases supporting large tribes of Berbers. They are known as Tuaregs and are among the wildest of the nomad races that inhabit the desert. Once they had an unenviable reputation as the greatest robbers in the Sahara, but the French have been trying to curb their "taking" ways. Their country is well placed to foster in them such tendencies. It lies on the trade route of caravans from the Niger to the north with poorly watered areas to the north and south. Most of the Tuaregs have become expert camel drivers in order to enable them to catch up with and overhaul their quarries.

The customs of these people always provide a source of interest because the woman of the family is the "head of the house" and dictates the goings and comings of her better-half. On the death of the chief the son of his eldest sister, in no case his own son, is chosen to rule in his stead, subject to the approval of the tribesmen.

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IMPROVING MUSCLES AND MAINTAINING MORALE AMONG THE MEN OF SWITZERLAND'S NATIONAL MILITIA

Service in the militia is compulsory and universal among the Swiss, with few exceptions, except for physical disability. Those who are excused or are rejected pay additional taxes. Liability for military service extends from a man's 20th through his 48th year. The men from 20 to 32 years comprise the Ausguz, or "Elite," classes of the militia. (See Bulletin No. 5.)

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Geneva: Which May Appeal to Its Guest, The League

CALLING on the League of Nations—from within its own household, so to speak—to settle a discussion with France, next door, is an action threatened by the Canton of Geneva of the Swiss Republic, in which the world organization has its seat.

This queer combination of world problem and domestic problem results from Geneva's being a sort of political and economic peninsula thrust into France.

Geneva Has a Slender Tie With Switzerland

The Canton of Geneva seems to hang precariously to the rest of Switzerland like a fragment of food on the bottom of a spoon. Though it has an area of more than a hundred square miles its contact with Swiss territory is across a narrow neck little more than three miles wide. The contact with France, on the other hand, is along a border more than 50 miles long.

Naturally, Geneva has looked largely to French land, only a stone's throw away in every direction, for its fresh food supplies. The fact that this surrounding region is one of France's garden spots increased this natural dependence. Ringing Geneva round are the prolific orchards and gardens and chestnut groves of the Departments of Upper Savoy and Ain, and the general farming regions in which they are set with their poultry and small flocks of farm animals.

Geneva has drawn many of its supplies from this region for centuries, long before the territory near-by was either French or Swiss. The city was virtually independent during the Middle Ages, being ruled as the temporal realm of a bishop appointed by the Pope. For fifteen years after the First French Republic was established, Geneva was annexed to France, and no question of boundaries arose.

Versailles Treaty Abolishes Century Old Privilege

When the canton's independence was restored in 1815, the custom of drawing on the surrounding country for supplies was recognized, and portions of Savoy and Ain were set apart as regions of free trade, the French economic frontier being maintained some miles back from the real boundary. When the recent Treaty of Versailles was written France inserted a clause moving the customs frontier up to the territorial boundary line. The Swiss citizens voted against their government's accepting the change, and it is the resulting dispute that may go to the League of Nations.

To see Savoy's frontiers creep closer is no innovation for Genevans. For six hundred years the city had to withstand the intrigues of the counts and later the dukes of Savoy to get possession of its territory. One duke in 1444 even went so far as to have himself elected Pope, in that capacity appointed himself bishop of Geneva, and then resigned the Papacy, retaining the bishopric. After the death of this resourceful bishop a succession of his relatives held the office of Bishop of Geneva, but they were finally ousted.

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Since the Titanic met its tragic fate twelve years ago last month the United States has established an ice patrol which virtually eliminates the dangers of steamship travel through the berg infested area.

Liners Keep a "Radio-eye" on the Iceberg Field

The radio of so many uses here plays the life preserver for it enables the patrol boats to send to every steamer through the region exact information about the location of icebergs, and, in turn, each steamship is expected to flash all observations of icebergs sighted to the patrol ship. Thus the eastern and southern and western limits of the iceberg area are always charted and the course of the larger icebergs that pass through this sector is accurately mapped.

Fortunately the icebergs that menace steampship traffic are too large to be affected greatly by the winds; it is the ocean currents that control their course, and the intricate processes of charting the North Atlantic currents have progressed far enough to enable the patrol ships to chart an iceberg's course with reasonable certainty.

Thus science, in large measure, has converted the erstwhile terror of sailors into a harmless delight to trans-Atlantic passengers.

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IODINE, A BY-PRODUCT OF NITRATE MANUFACTURE

Precipitated from the nitrate solution, iodine is the most important by-product of the caliche rock. By agreement among the nitrate establishments, its production is limited to every sixth year, in order that the market may not be overstocked. These rawhide kegs, filled with iodine, are worth $300 each. (See Bulletin No.

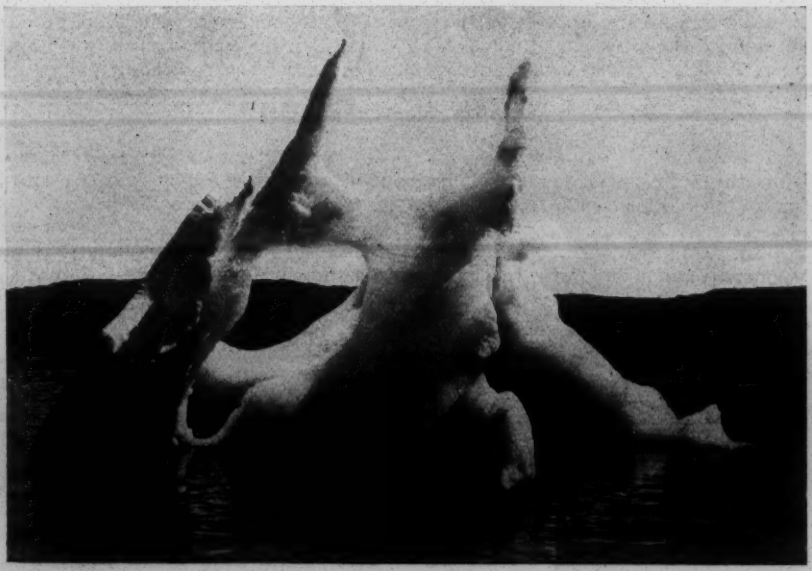
Savoy Tries in Vain to Control City

Another Savoyard duke used "economic pressure" that has an unpleasantly modern tone in his efforts to ruin the city he could not gain possession of. He induced his son-in-law, the King of France, to prohibit French merchants from visiting the famous old Geneva fair and to set dates for the Lyons fair that would conflict with those of the Geneva meeting.

Most dramatic of Savoy's efforts to gain possession of Geneva was "the Escalade." In 1602, while apparently friendly toward the city, the duke of Savoy sent his soldiers at night with ladders to scale Geneva's walls. The intruders were discovered, many killed, and the rest driven out. When Geneva became the stronghold of the Reformation, "the Protestant Rome," its relations with Catholic Savoy were even more strained. Alliance with cities of the Swiss Confederation afforded protection, however, and the city held its own.

Modern Geneva, besides being the seat of the League of Nations, draws to its confines thousands of visitors and even permanent residents from many lands, and so is in more senses than one an international city. Astride the Rhone where it dashes from Lake Geneva, the city is most picturesquely situated. At its door the lake furnishes a delightful pathway to some of the most beautiful scenery and some of the most delightful resorts in Switzerland.

Bulletin No. 5, May 12, 1924.



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A WEIRD ICEBERG IN BATTLE HARBOR, LABRADOR. **(See Bulletin 4.)**